CAT-III

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BEE01T1004

Embedded Technology and IoT

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Section-24

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Semester: 2 Section:24

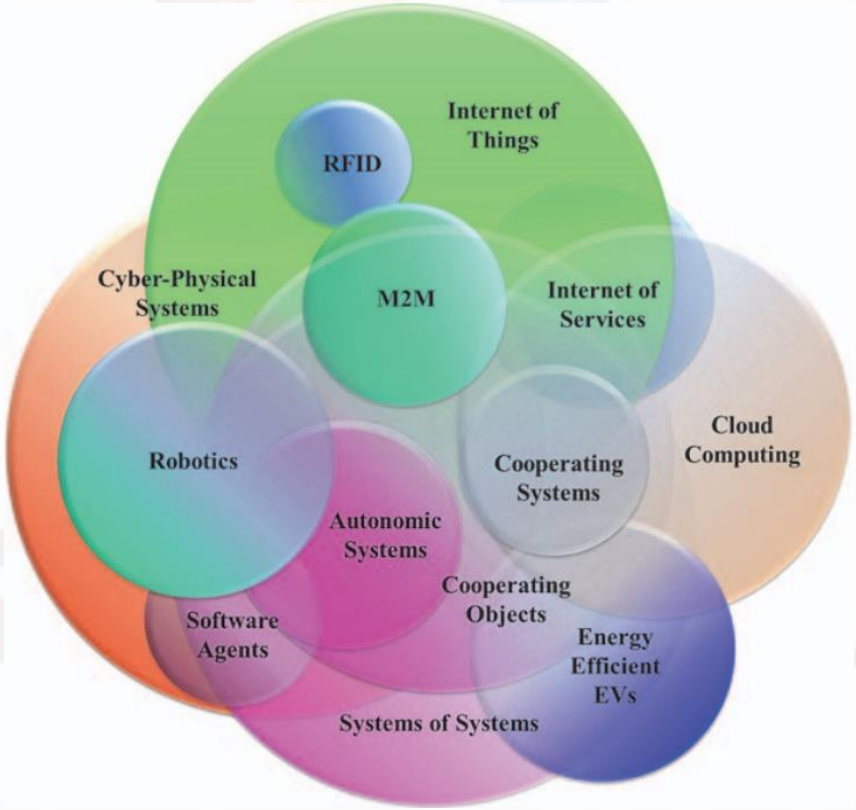
Cloud Computing and Big data

Contents

- Introduction of technology trends
  - IoT, Cloud Computing and Big data
- Integration of Clouds, Big data considering the IoT
  - Various examples, related activities
- Cloud-based Internet of Things
  - Basic concepts
  - Architectural views
- Challenges for future standardization
- Conclusion

Cloud Computing and Big data

Technology Convergence



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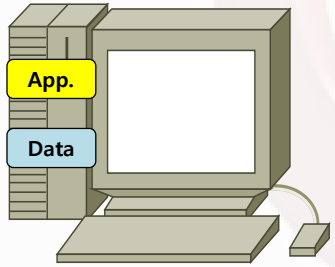
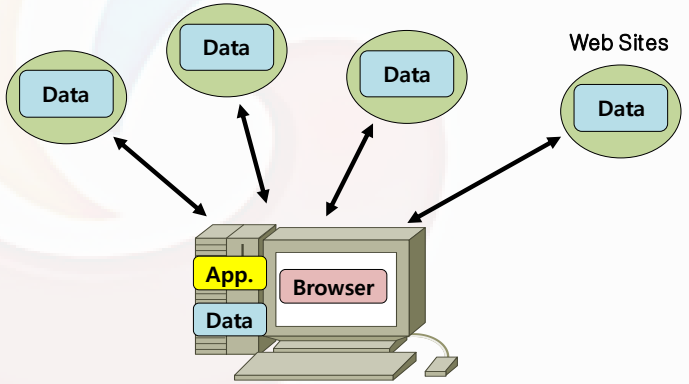
From stand alone PC to the Cloud-based IoT

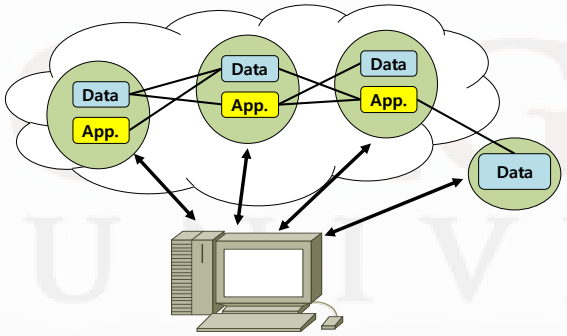
1st Phase – Stand Alone Computer



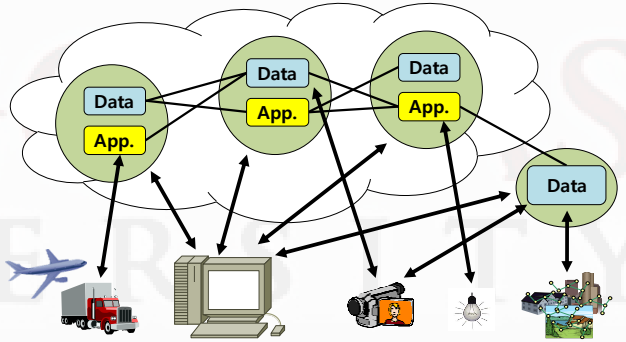
2nd Phase – The Web



3rd Phase – The Cloud



4th Phase – Cloud + IoT



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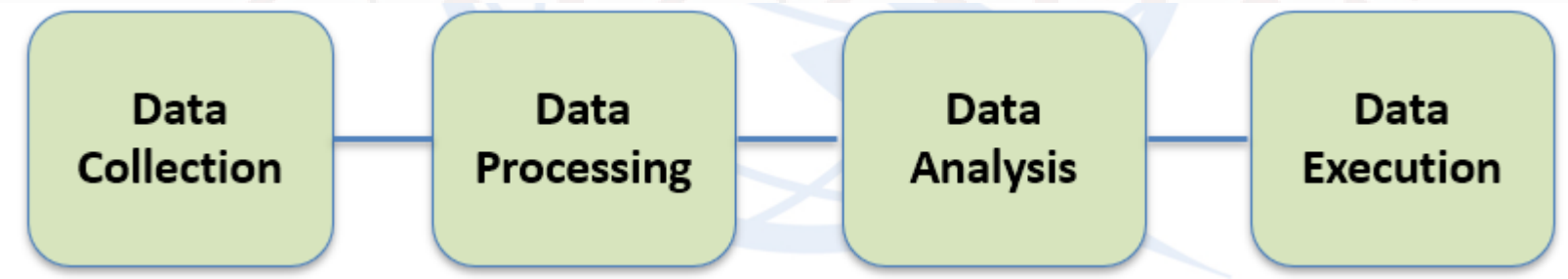
Big Data

- A category of technologies and services where the capabilities provided to collect, store, search, share, analyze and visualize data which have the characteristics of high-volume, high-velocity and high-variety.



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IoT & Big Data

- Big Data is not just about volume
  - Volume, Velocity, and Variety
  - Geo-distribution from IoT

- Technical aspects
  - Data collected and stored continues to grow exponentially
  - Data is increasingly everywhere and in many formats
  - Traditional solutions are failing under new requirements
  - ➔ Aggregate and process data from Things in the Cloud

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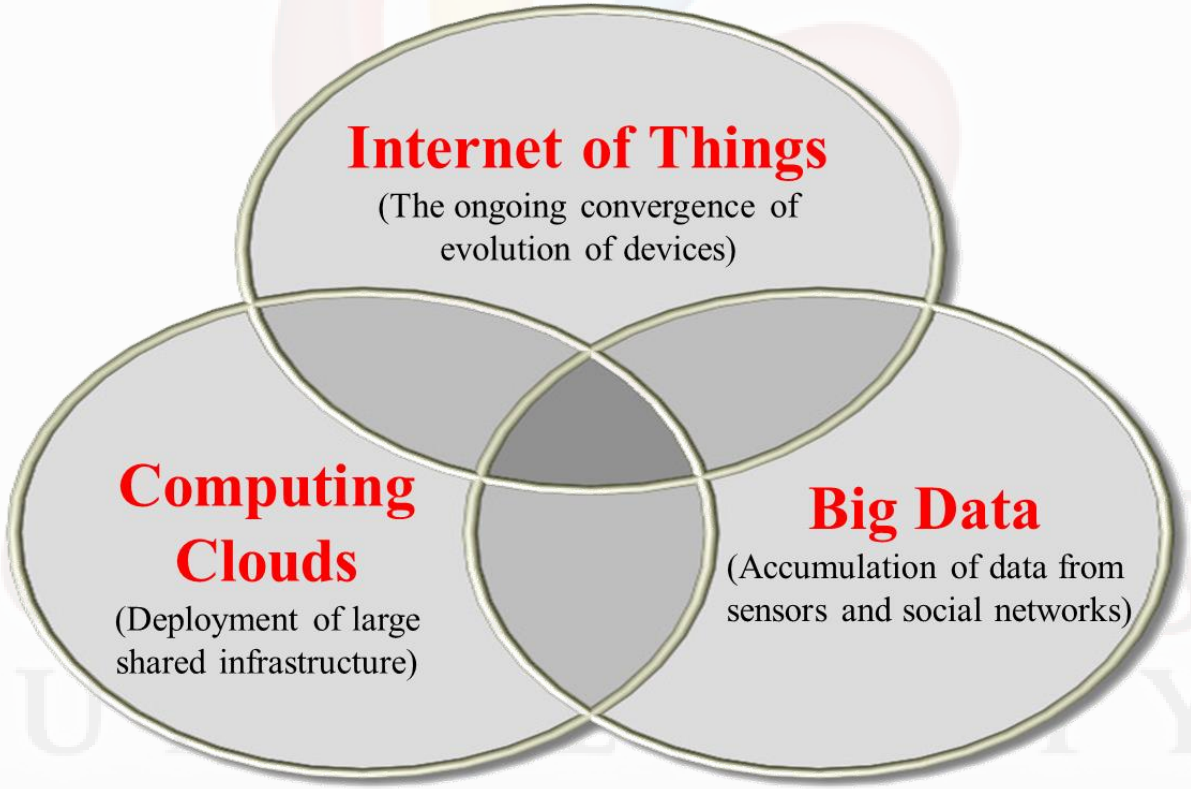
Exciting new challenges



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Vision - Interdisciplinary fusion revolution

- Ubiquitous connectivity
  - Allowing for whenever, whoever, wherever, whatever types of communications
- Pervasive reality
  - For effective interface to provide connectable real world environments
- Ambient intelligence
  - Allowing for innovative communications and providing increased value creation.

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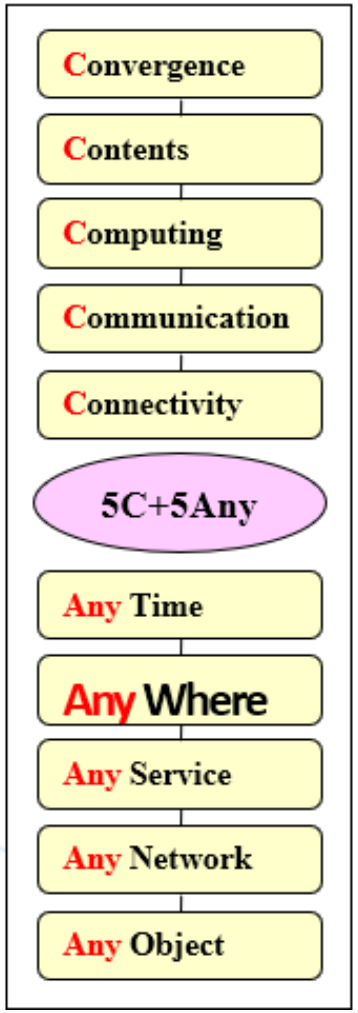
Clouds, Big data considering the IoT

- Data stored in the “Cloud”
- Data follows you & your devices
- Data accessible anywhere
- Data can be shared with others



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Integration of Clouds and the IoT

- Combining clouds and the IoT
  - To support required resources to increasing heterogamous objects
  - To meet the dynamic computational needs of environmental applications with existing sensor network technologies
- Benefits
  - The cloud can work on behalf of the object for increasing availability, maintaining performance and scalability.
  - The cloud can support resource continuity so that objects move freely changing access technologies while using resources from the same cloud.

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Key features of clouds to support the IoT

- Several features available in clouds are requirements of resource-constrained objects
  - Flexibility of resource allocation
  - More intelligent applications
  - Energy saving
  - No on-site infrastructure
  - Heterogeneity of the smart environment
  - Scalability and agility
  - Virtualization

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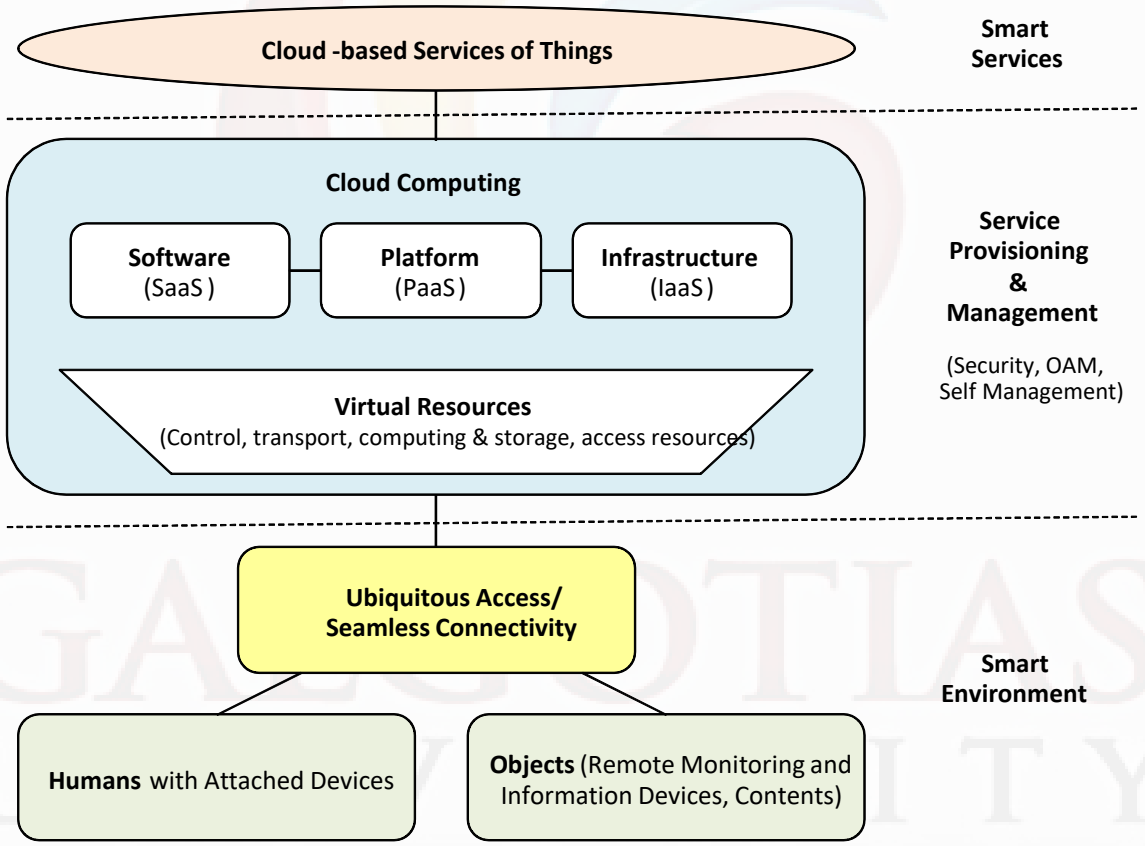
A conceptual diagram for the cloud-based Internet of Things



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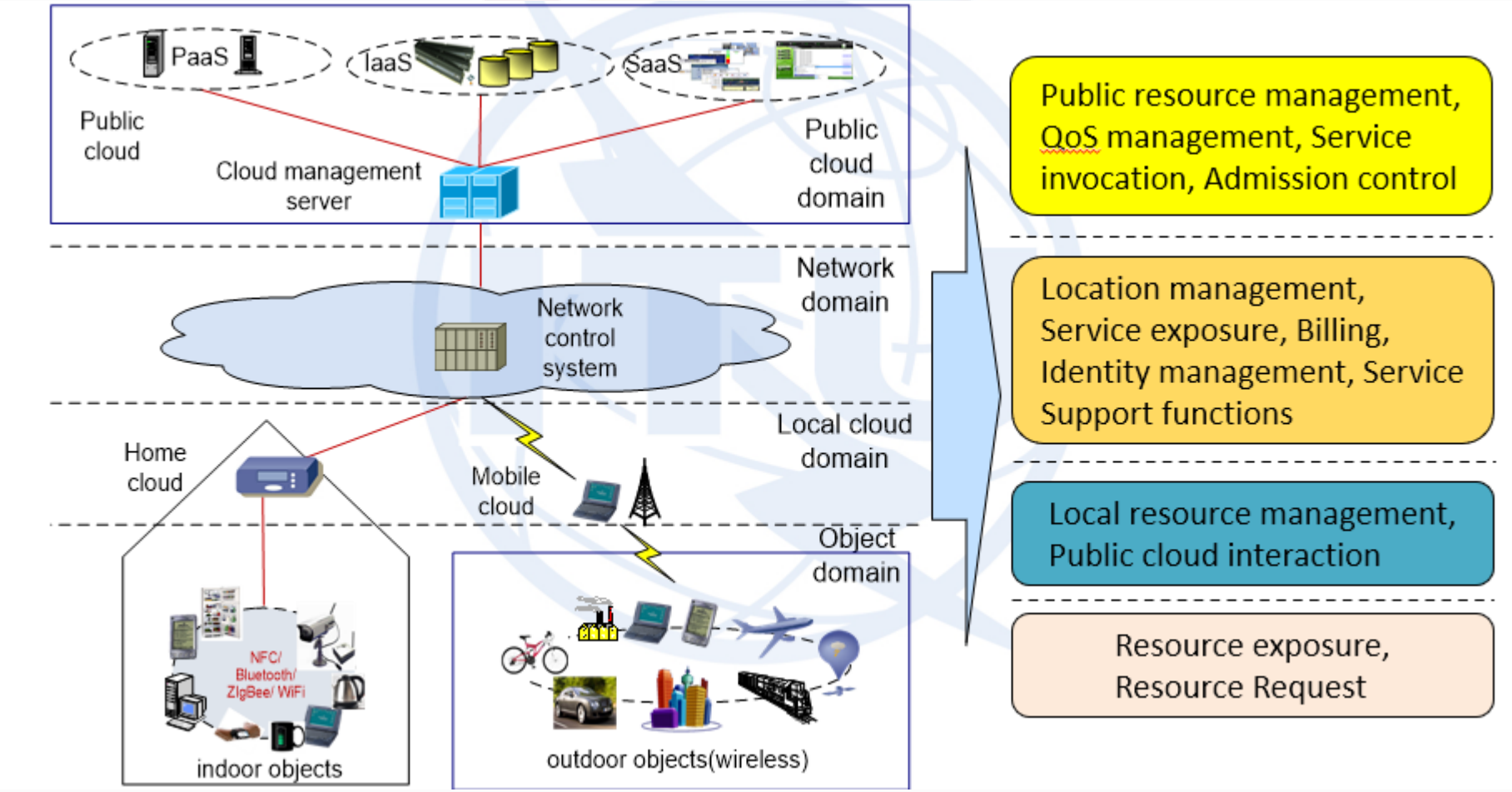
The IoT using local distributed clouds



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Challenges for future standardization

- Technical consideration for standardization
  - Object naming
  - Virtualization
  - Inter-clouds
  - Distributed clouds (edge clouds)
  - Security
  - Geo-distribution
  - Mobility considering mobile objects
  - Resource provisioning for constraint objects
  - Application-awareness
  - Big Data considering dynamics of traffic pattern
  - Connected objects and interdisciplinary fusion services

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Conclusion

- The cloud-based IoT service environment
  - Combines the cloud computing, big data and the IoT
  - Aims to efficiently support various services using cloud and analytics technologies from different kinds of objects (e.g., devices, machines, etc.).
- Standardization
  - The relevant standardization efforts for realization of the cloud-based IoT need to be accelerated with special consideration of their commercial viability.

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Course Code : XXXXXX Course Name: Data structures using C

THANK YOU